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COMP 226 : COMPUTER NETWORKS CAT 1

A.**What is a computer network?**

Two or more computers that are connected with one another for the purpose of communicating data electronically.

B. Describe two ways to measure network performance.

Latency - latency refers to the measure of time it takes for data to reach its destination across a network.

Packet Loss - refers to the number of data packets that were successfully sent out from one point in a network, but were dropped during data transmission and never reached their destination.

C. i) What is network topology?

It refers to the manner in which the links and nodes of a network are arranged to relate to each other.

ii) Briefly describe three types of network topologies.

Bus Topology

Bus topology is the simplest kind of topology in which a common bus or channel is used for communication in the network.

Ring Topology

Ring topology is a topology in which each computer is connected to exactly two other computers to form the ring.

Star Topology

Star topology is a computer network topology in which all the nodes are connected to a centralized hub.

D) Describe the role of the following in a computer network.

i)**Router**

A router receives and sends data on computer networks.

ii)**Switch**

A switch enables connected devices to share information and talk to each other.

iii)**Firewall**

A firewall is a network security device that monitors incoming and outgoing network traffic and decides whether to allow or block specific traffic based on a defined set of security rules.

iv)**Hub**

A hub is a physical layer networking device which is used to connect multiple devices in a network.

E) What are four differences between TCP and UDP.

a. TCP is able to sequence whereas UDP is unable.

b. TCP is slower than UDP.

c. TCP does not support broadcasting whereas UDP do support.

d. TCP can guarantee delivery of data to destination router whereas UDP does not.

F) What is the motivation behind NAT?

A Network Address Translation (NAT) is the process of mapping an internet protocol (IP) address to another by changing the header of IP packets while in transit via a router. This helps to improve security and decrease the number of IP addresses an organization needs.

G) Describe the following types of NAT.

i) Static NAT

In this, a single private IP address is mapped with single Public IP address, i.e., a private IP address is translated to a public IP address. It is used in Web hosting.

ii) Dynamic NAT

In this type of NAT, multiple private IP address are mapped to a pool of public IP address . It is used when we know the number of fixed users wants to access the Internet at a given point of time.

iii) Network Address and Port Translation(NAPT)

This is also known as NAT overload. In this, many local (private) IP addresses can be translated to single public IP address. Port numbers are used to distinguish the traffic, i.e., which traffic belongs to which IP address.

iv) Easy IP

Is a fast, powerful, scalable IP Address Management (IPAM) solution, that helps you manage your entire IP and DNS network infrastructure more efficiently.

v) NAT Server

Network Address Translation (NAT) is designed for IP address conservation. It enables private IP networks that use unregistered IP addresses to connect to the Internet.This provides additional security by effectively hiding the entire internal network behind that address.